REPORT

OF

THE MINING HEALTH AND SAFETY BRANCH

FOR

JANUARY, FEBRUARY

AND MARCH

1986

Mining Health and Safety Branch
400 University Avenue
Toronto, Ontario
M7A 1T7

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INITIAL REPORT OF A FATAL ACCIDENT

NAME: Doyle Judd

EMPLOYER: Renabie Gold Mines Ltd.
Missanabie, Ontario P0M 2H0

LOCATION: Renabie Mine

INCIDENT: On January 15, 1986, Doyle L. Judd was fatally injured when he was struck by and buried under loose at the face of the 3103 decline near the 3300 ventilation raise located on the 2720.47 level.

NAME: Henry Hens

EMPLOYER: Campbell Red Lake Mines Ltd.
P.O. Box 10
BLAMERTOWN, Ontario P0V 1C0

LOCATION: Campbell Red Lake Gold Mine

INCIDENT: On January 22, 1986, Henry Hens was fatally injured when caught in a run of broken rock.

NAME: Maurice Roy

EMPLOYER: Rio Algom Limited
P.O. Box 1500
Elliot Lake, Ontario P5A 2K1

LOCATION: Panel Mine

INCIDENT: On February 15, 1986, Maurice Roy was fatally injured when crushed between a railway car and a chute underground.

NAME: Ingo Budweg

EMPLOYER: Campbell Red Lake Mines Ltd.
P.O. Box 10
BLAMERTOWN, Ontario P0V 1C0

LOCATION: Campbell Red Lake Gold Mine

INCIDENT: On March 5, 1986, Ingo Budweg, a shift boss, was fatally injured when the broken rock he was attempting to bar into a hung-up mill hole let go taking him with it.

INCO LIMITED

STOBIE MINE - SUDBURY, ONTARIO

RICHARD LACROIX - JUNE 11, 1985
(Amended April 1986)

Richard Lacroix, aged 33, a trammer at Inco Limited's Stobie Mine was fatally crushed in an ore car by a run of ore at 64 chute 1400 level on June 11, 1985. Lacroix had 15 years experience at Inco having been a trammer for the last 18 months.

The 64 ore pass on 1400 level south receives muck from the 1000 and 1200 levels. The discharge chute is a dual action type. Two air cylinders operate the discharge pan while a single cylinder controls a T bar and chains. Two smaller cylinders lock the pan in the closed position when the chute is not in use.

Lacroix and his partner, Val Chaisson, were operating an 8 car Grangesberg train loading cars from the 64 ore pass. Each car required two moves to be filled completely. While loading the third car of the sixth trip, Lacroix, who was operating the chute controls, signalled the motorman, Chaisson, that his assistance was required.

When Chaisson arrived on the gangway, the control chains and pan were in the down position and a 5" x 8" x 108" timber was jammed under a large piece of muck in the chute. It was Lacroix's plan to lift the pan which in turn would lift the chunk changing its position so it would pass under the chains. Two attempts were made, without success. Chaisson was at the chute controls and Lacroix was standing in front of the chute. Chaisson claims that a hang-up suddenly let go. The falling muck forced the chains up, spilled onto the pan and hit the timber. Lacroix was found in a sitting position in the car under two large pieces of muck.

An inquest was held before Coroner Dr. Brian Bloomfield on September 27, 1985 at the Sudbury Courthouse. The jury determined that Richard Lacroix came to his death at 2140 hours on June 11, 1985 at Inco's Stobie Mine by asphyxiation as a result of a crushed chest caused by a rock fall due to unexplained causes.

The jury's recommendations were as follows:

1. That training in the operation of all equipment new to the operators be mandatory. Responsibility for this training lies with the company. Such training programmes should be scrutinized on an on-going basis by the Ministry of Labour of the government of Ontario. Leadership for these training programmes should be given only by those individuals officially recognized by the Ministry of Labour as having expertise in the operation of the specified new equipment.

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Richard Lacroix (cont'd)

2. That annual training in all aspects of mine safety be mandatory for all employees at mining companies and that this training must be done by professionals certified by the Ministry of Labour of the government of Ontario.

3. That the training programmes mentioned above be available in both English and French.

4. That procedures for reporting defective or unsafe equipment or unsafe working conditions must be identified in writing and submitted immediately to the appropriate authorities.

5. That a log be kept of all incidences of unsafe work conditions and mechanical failures at each level in an operating mine. The foreman would be responsible for this log. The log would list the time, date, location and nature of the incidences and breakdowns.

6. That there should be a planned maintenance programme in all operating mines for all machinery and work theatres which is preventive rather than an ad hoc response to a present emergency.

7. That the controls of all equipment used in an operating mine be labelled with internationally recognizable shapes or symbols or colours.

8. That whenever there is a blockage at the mine chute, there should be two miners present on the gangway.

Amended
April 1986

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PROSECUTIONS UNDER THE OCCUPATIONAL HEALTH AND SAFETY ACT
MINING HEALTH AND SAFETY BRANCH
FISCAL YEAR 1985-86

Date of First Appearance	Employer	Incident	Charge Against	Total Charges			Fine	Section of Act	Section of Reg.	Comments
				L	W	D				
11/3/85	Gorf Contracting (1982) Ltd.	Fall arrest system	E	4	3	-	$2,000	14(1)(c) 14(1)(c) 14(1)(c) 14(2)(b)	84(1)	Company pleaded guilty Charge withdrawn " " " "
12/2/85	The Canadian Salt Company Limited	Barricades and Records	E	3	1	-	$2,500 $2,500	14(1)(c) 14(1)(c) 14(2)(c)	65 62(2)	Company pleaded guilty " " " Charge withdrawn
09/08/85	Teck Corporation Leitch Division	Compressor disintegration	E	2	-	2	-	14(1)(b) 14(2)(g)		Charge dismissed " "
21/03/85	Mattabi Mines Ltd.	Ground Support	E	1	-	1	-	14(1)(c)	63(1)	Charge dismissed.
21/03/85	Markel Mining & Tunnelling Ltd.	Raise Climber Cage	E	2	0	1	- $5,000	14(1)(b) 14(2)(g)		Charge dismissed. Company pleaded guilty.

Employer (E) Owner (O) Supervisor (S) Worker (W)
Laid (L) Withdrawn (W) Dismissed (D)

STOP WORK ORDERS - FIRST QUARTER 1986

Stop work orders were issued on the following dates at the locations indicated for the contraventions described:

DATE	SECTION CONTRAVENED	DESCRIPTION
Jan 7		Unsafe ground conditions workers refusing
Jan 8	M. Reg 64(1)	Drift needed scaling & bolting
Jan 9	Act 14(2) Act 14(2)	Strontium - Aluminum press: Unsafe Needed safe operating procedures
Jan 21	M. Reg 211(a)	Hoistrope not coiling properly
Jan 28	M. Reg 129(5)	Drilling into bottom of bad blast
Feb 6	M. Reg 188(2) M. Reg 44(1) M. Reg 44(1)	Screening plant required: Guarding Catwalks Handrails
Feb 12	M. Reg 13 M. Reg 189(5) Act 14(2)	Alimak raise climber needed: Fall arrest system Repairs to man door Written installation procedures
Feb 12	M. Reg 52(1)	Hazardous accumulation of materials
Feb 13	M. Reg 45(2) M. Reg 45(1) M. Reg 49(1) M. Reg 52(1) M. Reg 13 M. Reg 244(01)	Ore pass raise needed: Ladders secured Ladders repaired Platforms offset Ladderway cleaned of muck Fall arrest system Ventilation
Feb 18	M. Reg 100(01)	Jarco brakes inoperative

STOP WORK ORDERS - FIRST QUARTER 1986

DATE	SECTION CONTRAVENED	DESCRIPTION
Feb 18	M. Reg 243(1) M. Reg 243(1) M. Reg 248(a) M. Reg 63(1)	Heading required: Ventilation Removal of contaminants Wetting down of blasted muck Ground made safe
Feb 18	M. Reg 148	Main control panel interlock broken
Feb 19	M. Reg 43	Ferrosilicon ball mill was explosion hazard
Feb 26	M. Reg 64	Drift had loose above workers
Feb 27	M. Reg 250 M. Reg 250 M. Reg 250 M. Reg 250	Level needed ventilation Diamond drill station needed ventilation Drift needed ventilation Diamond drill station needed ventilation
Mar 3	M. Reg 178(1) M. Reg 188(2) M. Reg 44(3) M. Reg 52(2) M. Reg 178(1) M. Reg 178(1)	Screening plant required: Guarding Guarding Handrails Opening Guarded Stacker conveyor required guarding Loading bin & feed conveyor required guarding
Mar 3	Act 28(1) Act 14(1) M. Reg 209(c)	Shaft staging required: P. Eng. reports reloading Procedures 3 dead turns on drums
Mar 4	M. Reg 152(2) Act 14(2) Act 14(2)	Trucks dumping: too close to power line notify drivers of hazard install fence or barricade
Mar 6	Act 28(1)	Sill had ground control problems
Mar 21	Act 28(1) M. Reg 65	Stope: had ground control problems needed warning signs

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CODING FOR UNUSUAL OCCURRENCES

1.	DAM or BULKHEAD FAILURE	DU
2.	ELECTRICAL	EL
3.	EQUIPMENT, FAILURE or DAMAGE	EF
4.	EXPLOSIONS	EN
5.	EXPLOSIVES	EX
6.	FLAMMABLE GAS	G
7.	HOISTING (shaft etc)	HS
8.	ROCK MOVEMENT	RM
9.	VEHICLES	MV
10.	WATER, Inrush or Flood	IW
11.	MISCELLANEOUS	MS

Note: For Occurrences resulting in a fire (F) is added to the subscript.

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Revised April, 1985

ELECTRICAL - EL

UO-850906-03-01-EL(F) Sep. 6/85 Rio Algom Ltd., Quirke II
INCIDENT: When a faulty power cable was energized by closing a 200 amp disconnect, a second fault developed in a 4/0 Teck cable fed from the same distribution panel, causing a fire. A substation some 3000 ft. away fed this distribution panel. The ground fault protection failed.
CAUSE: The low fault current and defective ground sensor permitted the fault to remain for six or seven minutes instead of tripping immediately.
PREVENTATIVE ACTION: 1. There was a mistake in the wiring of the protection.
2. An additional fused disconnect will be installed halfway in the branch feeder.
3. Circuit breaker settings were tested and re-set.

UO-851009-03-02-EL(F) Oct. 9/85 Rio Algom Ltd., Quirke II
INCIDENT: A chain supporting vent tubing fell onto a trolley line and trolley pole and created a path to ground. The heat caused the vent tubing to ignite. The fire also burnt a hole in a nearby 2" water hose. The escaping water extinguished the fire. There were no injuries. Damage was restricted to a small portion of vent tubing.
CAUSE: The chain failed due to vibration.
PREVENTATIVE ACTION: The trolley line will be relocated.

UO-851127-03-03-EL(F) Nov. 27/85 Rio Algom Ltd., Stanleigh Mine
INCIDENT: A conveyor operator noticed smoke coming from a conveyor drive. He stopped the conveyor and found the smoke was coming from the drive motor coupling. The coupling between the drive motor and the hydraulic pump had come loose on the shaft. The coupling has a rubber insert between the coupling halves. When the coupling came loose on the shaft it overheated, causing the rubber insert to smoulder. There were no injuries. Damage was confined to the rubber insert.
CAUSE: Loose coupling on shaft creating heat buildup in coupling and causing rubber insert to smoke.
PREVENTATIVE ACTION: Conveyor will be checked on daily and weekly inspections.

UO-851203-03-04-EL Dec. 3/85 Denison Mines Ltd., #2 Shaft
INCIDENT: A two man crew was removing a buildup of concrete from around a cement line in the shaft manway. The concrete had leaked from the cement line, causing a buildup of concrete on the landings, walls and on all services in the adjacent

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compartment. Using an air chipping hammer, the chipping steel punctured the jacket of a 4.16 KV power cable. The circuit breaker feeding the cable tripped immediately.
CAUSE: Chipping a buildup of concrete around the power cables in the shaft manway compartment. Not aware of the position of the power cable and definitely not aware of the hazard.
PREVENTATIVE ACTION: Similar undertakings will be closely supervised and all hazards will be identified prior to starting a job.

UO-851219-03-05-EL Dec. 19/85 Falconbridge Ltd., No. 9 Shaft
INCIDENT: While cleaning insulators, an electrician contacted an energized 4160 volt bus inside the cubicle of a GE Limitamp, 5 KV motor starter. He suffered burns to his hands.
CAUSE: 1. Configuration of switchgear (i.e. disconnect switch on top) camouflaged the hazard.
2. Lapse of awareness by the electrician.
3. Opening in barricade between fuses/disconnect and energized bus.
PREVENTATIVE ACTION: 1. The accident was reviewed with all maintenance electrical personnel.
2. In future, this type of work will be performed only when the entire starter is de-energized.

UO-860103-03-06-EL Jan. 3/86 Rio Algom Ltd., Stanleigh Mine
INCIDENT: A wire from the battery to the controller of a locomotive burnt off. There were no injuries. One wire was damaged.
CAUSE: The wire from the controller to the battery had been rubbing against the locomotive chassis. The insulation had worn through and the rubbing had also reduced the size of the wire and could no longer carry the current. The wire at that point overheated and blew open.
PREVENTATIVE ACTION: The wire on the locos will be protected in areas where they contact the chassis with heavy rubber covering.

UO-860120-03-07-EL(F) Jan. 20/86 Rio Algom Ltd., Stanleigh Mine
INCIDENT: Electricians installed a plug on a battery motor and when they connected it to the battery it caught on fire. A 20 lb. fire extinguisher was used to put out the fire. There were no injuries. The metal plug and cable were damaged.
CAUSE: The cable leading from the plug to the battery was probably shorted and when connected to the battery it overheated and caught fire.
PREVENTATIVE ACTION: Electricians have been instructed to test cables for short circuit before installation.

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EQUIPMENT, FAILURE or DAMAGE - EF

UO-850509-03-01-EF May 9/85 Inco Limited, Creighton
INCIDENT: A 13.8 KV shaft power cable, installed in 1971, failed. There was no damage other than the insulation inside the cable. No workers were injured.
CAUSE: Insulation breakdown. The mine has a history of power cables failing either during a severe lightning storm or just after. A lightning storm, with strikes observed in the area, happened the previous evening to this incident. Power surges from lightning storms, not high enough to be seen by the lightning arrestors, could stress cable insulation over the years, leading to eventual insulation breakdown.
PREVENTATIVE ACTION: Surge protection is being installed.

UO-850920-03-02-EF(F) Sept. 20/85 Rio Algom Ltd., Stanleigh Mine
INCIDENT: An "ASEA" 12 ton trolley locomotive caught on fire in the haulage drift spreading smoke throughout the western section of the level of the underground mine. Stench gas was injected and a rescue team was dispatched underground. All workers were accounted for. The three-man haulage crew was taken to the local hospital because of smoke inhalation. One worker required further medical attention.
CAUSE: The fire was caused by a short circuit in the power cable between the trolley pantograph and the connector on the deck of the locomotive. The rubber jacket of the cable had worn through and the electric power shorted through the locomotive frame, resulting in arcing and burning the cable's insulation and producing large amount of smoke.
PREVENTATIVE ACTION: The pantograph cables have been covered with a rubber hose on all trolley locomotives at the mine.

UO-851021-03-03-EF(F) Oct. 21/85 Dickenson Mines Ltd., Arthur W. White Mine
INCIDENT: The propane vapourizer had caught on fire. The fire department was called and they put out the fire.
CAUSE: Suspect that the propane pot in the vapourizer developed a crack and leaked propane into the burners below.
PREVENTATIVE ACTION: Still under investigation.

UO-860114-03-04-EF Jan. 14/86 Rio Algom Ltd., Quirke II
INCIDENT: The master mechanic noticed that the shaft was downcasting. He then checked the fresh air fans and found #10 fan had lost all its blades.
CAUSE: It appears that one of the fan blades failed and the broken pieces caused the rest of the blades to self-destruct. The failure of the blade was due to metal fatigue.
PREVENTATIVE ACTION: The fan is and will continue to be inspected on a regular preventative maintenance schedule.

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UO-860201-03-05-EF Feb. 1/86 Rio Algom Ltd., Quirke II
INCIDENT: The #36 fan at Quirke I exhaust raise had all the blades sheared off the fan hub. There were no injuries. Damaged blades and fan casing.
CAUSE: Metal fatigue. Vibration monitoring did not respond fast enough to shut down the fan.
PREVENTATIVE ACTION: The company will have the vibration monitor on fan checked.

UO-860222-03-06-EF(F) Feb. 22/86, Agnico-Eagle Mines Ltd., Mill Concentrator Cobalt
INCIDENT: A fire destroyed the mill-concentrator. A watchman discovered the fire at approximately 8:30 AM. The fire spread in the old wooden building very quickly. The mill was not in use during the winter months.
CAUSE: Unknown. Investigators from the fire marshall's office and adjustors from the insurance company are investigating.
PREVENTATIVE ACTION: None at this time.

EXPLOSIVES - EX

UO-850827-03-01-EX Aug. 27/85, Cornwall Gravel Co. Ltd., Quarry
INCIDENT: A worker who took refuge in a crusher operator's booth was struck and injured by flying rock from a secondary blast, which was initiated from the booth.
CAUSE: Improper procedures were followed. A safe shelter was not provided and the blasters were not sufficiently trained in blasting procedures.
PREVENTATIVE ACTION: Workers will be trained in blasting procedures, and a metal shelter has been provided from which blasting will be carried out.

UO-850916-03-02-EX Sep. 16/85 Rio Algom Ltd., Stanleigh Mine
INCIDENT: A mine captain tossed a rock down the pass and listened to determine how far it fell. As he listened, the haulage crew blasted a hang-up at the bottom of the pass. The noise of the explosion injured the employee's ear drums.
CAUSE: No communication between top of the ore pass and haulage level (20m).
PREVENTATIVE ACTION: Flashing lights and horns are being installed in the sill drifts at each dump point and will be activated by haulage crew when chute blasting is being carried out.

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UO-860131-03-03-EX Jan. 31/86 Rio Algom Ltd., Stanleigh Mine
INCIDENT: A skiptender on 4200 level was exposed to blasting fumes from 3619 drift.
CAUSE: Smoke from 3619 drift followed the ventilation path to the loading pocket at quitting time. Central blasting is practiced but with workers underground.
PREVENTATIVE ACTION: In the future, all workers will be hoisted to surface when blasting in 3619 drift.

FLAMMABLE GAS - G

UO-850919-03-01-G Sept. 19/85 Rio Algom Ltd., Stanleigh Mine
INCIDENT: Occurrence of methane at 41041 decline.
CAUSE: Common occurrence when drilling in these geological structures.
PREVENTATIVE ACTION: Heading was stopped, roped off, and auxiliary ventilation maintained until monitoring proved the area safe.

UO-851021-03-02-G Oct. 21/85 Rio Algom Ltd., Stanleigh Mine
INCIDENT: Methane was intersected on the 37641 incline in a diamond drill up hole. The depth of the intersection was twenty feet.
CAUSE: Common occurrence when drilling in these geological structures.
PREVENTATIVE ACTION: The driller and machine were moved to another workplace and the area was ventilated with 10,800 cfm. The night shift supervisor will monitor for methane.

UO-851024-03-03-G Oct. 24/85 Noranda Inc., Mattabi Mines Ltd.
INCIDENT: 1550 development crew lit the blast, opened the valve for spray, and went to surface. "Excessive" SO_2 gas resulted because the air-water spray did not work.
CAUSE: The water spray was plugged.
PREVENTATIVE ACTION: Before lighting a blast, the miners are to verify that the water supply is in good working order.

UO-851207-03-04-G Dec. 7/85 Falconbridge Ltd., Strathcona Mine
INCIDENT: A noxious gas was encountered by an Alimak Raise crew 100 feet above the 4900 level. The crew had installed some resin grouted bolts and were drilling when they suddenly

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felt weak and complained of sore eyes. Six hours later, the raise was checked for carbon monoxide, methane and oxygen deficiency. No gas was encountered and oxygen content was normal.
CAUSE: Unknown, but it is suspected that they had encountered either a pocket of gas or an oxygen deficiency.
PREVENTATIVE ACTION: Crews were told to leave the area immediately on the slightest suspicion of foul air. Raise crews be supplied with gas testing devices.

UO-851213-03-05-G Dec. 13/85 to Jan 8/86 Rio Algom Ltd., Stanleigh Mine
INCIDENT: Occurrence of methane as follows:
1. 37252 Decline - December 13, 1985
2. 36021 5/D East - December 17, 1985
3. 36021 E Level - January 2, 1986
4. 36643 Incline - January 8, 1986

CAUSE: Common occurrence when drilling in these geological structures.
PREVENTATIVE ACTION: The standard procedure of evacuation and barricading the area was followed. The areas are being ventilated and monitored.

UO-860103-03-06-G Jan. 3/86 to /Jan. 23/86 Rio Algom Ltd., Stanleigh Mine
INCIDENT: Occurrence of methane as follows:
1. 36643 incline - January 8, 1986
2. 36021 sill drift east - January 9, 1986
3. 36021 sill drift east - January 10, 1986
4. 36021 sill drift east - January 13, 1986
5. 36021-1 incline - January 15, 1986
6. 39231-1 incline - January 22, 1986
7. 36021 west sill drift - January 23, 1986

CAUSE: Common occurrence when drilling in these geological structures.
PREVENTATIVE ACTION: Areas are being ventilated and monitored.

UO-860131-03-07-G Jan. 31/86 Rio Algom Ltd., Stanleigh Mine
INCIDENT: Skiptender was exposed to fumes from central blasting. This smoke came from 3619 heading.
CAUSE: Smoke from 3619 blast came to the station and then followed ventilation path to 4200 level.
PREVENTATIVE ACTION: In the future, all men will be hoisted to surface when blasting in 3619 drift. Verify the written blasting procedure Section 145(2).

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UO-860206-03-08-G Feb. 6/86 Inco Limited, C.C. South Mine
INCIDENT: Flammable gas was encountered in a diamond drill hole on February 6, 1986 - 3000 Level and February 24, 1986 on 4000 Level.
CAUSE: Drilling in metasediments.
PREVENTATIVE ACTION: The crew was pulled out and the air hose was hooked up to blow at collar of hole and the entrance to drift was barricaded.

UO-860224-03-09-G Feb. 24/86 Inco Limited, C.C. South Mine
INCIDENT: A diamond drill hole encountered a flammable gas.
CAUSE: Drilling in metasediments.
PREVENTATIVE ACTION: Air hose hooked up to blow at collar of hole and roped off entrance to diamond drill station.

HOISTING (SHAFT, ETC.) - HS

UO-850910-03-01-HS Sept. 10/85 Noranda Inc., Mattabi Mines
INCIDENT: The conveyance dogged while an improvised underslung shaft
sinking bucket was being dumped at the 1550 level. The hoistman while attempting to return the empty bucket to 1800 level uncoiled the 1 -7/8 inch hoist rope onto the dogged skip/cage conveyance.
CAUSE: An improvised shaft clean-up was in progress. A shaft sinking bucket was slung below the main skip-cage unit. A special dump spill door had been installed at the 1500 level shaft station. The bounce from the empty bucket caused the safety dogs to apply on the main conveyance. The skip tender and hoistman did not notice this until the slack hoist rope was detected.
PREVENTATIVE ACTION: 1. Ensure the hoist "lifts" the conveyance after the bucket is dumped.
2. Continuous visual attention must be given this improvised hoisting and dumping arrangement while this clean up is in progress.

UO-850915-03-02-HS Sept. 15/85 Dynatec Mining, Macassa #3 Shaft
INCIDENT: A 415 foot length of 3 conductor electrical cable was being installed in the shaft. The cable manufacturer had installed a pulling eye on the end of the cable with a supposed safety factor of five. The pulling eye was hooked under the bucket. The hoist was lifting the cable off the reel to lower it down the pipe-cable compartment. The crew on the level signalled to stop the hoist. The reel kept on turning,

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unwinding all the cable from the reel. The cable end then fell from the reel and the jerk pulled the cable from the pulling eye. The cable fell down the shaft and was destroyed.
CAUSE: First, the crew should have kept the hoist moving very slowly. Secondly, the pulling eye does not appear to be a safe method as the three conductors are skinned and then crimped together in the pulling eye. There is no way of determining how tight the cable is in the crimp.

UO-850919-03-03-HS Sept. 19/85 Noranda Inc., Mattabi Mines
INCIDENT: In preparing to balance the skips for hoisting, the cagetender lowered the spill doors while one skip was still positioned below these spill doors. There was apprehension that a hoist rope had become kinked. No rope deformation occurred.
CAUSE: A misunderstanding. The controls for these spill doors were recently relocated. The controls had previously been on the 1280 spill pocket. They were moved up to the 1200 level station. The hoistman was not aware of this change. He presumed the cagetender had to climb down 80 feet to close the spill doors and there would be a time before the doors obstructed the shaft.
PREVENTATIVE ACTION: The procedure for shortening balance has been revised. Specifically, the skip must now be brought to the 1200 level, and be within the view of the cagetender. The hoistman must phone his request that the spill doors be lowered across the shaft compartment. This change has been reviewed with all cagetenders and hoistmen.

UO-851003-03-04-HS Oct. 3/85 Campbell Red Lake Mines Ltd., Campbell Red Lake Mine
INCIDENT: The hoist rope was noticed to be deformed (kinked) in compartment #3 on #4 hoist. The kink was located 30 feet above the top rope clip.
CAUSE: Not known. No abnormal occurrences were observed before the kink was spotted. The cage had been checked one hour earlier and nothing unusual was spotted.
PREVENTATIVE ACTION: Care must be practiced by hoist operators, deckmen and maintenance mechanics to avoid a repetition.

UO-851019-03-05-HS Oct. 19/85 Dickenson Mines Ltd., Arthur W. White Mine
INCIDENT: The skiptender opened the doors to fill the skip and muck started to run through the chains over-filling the skip. Approximately 1 1/2 tons of muck went down the shaft.
CAUSE: Control chains were found to be worn. Water from dam on 2 level was entering the orepass.
PREVENTATIVE ACTION: Control chains have been replaced. The water from the dam is now flowing into a drainhole.

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UO-851109-03-06-HS Nov. 9/85 Dickenson Mines Ltd., Arthur W. White Mine

INCIDENT: The hoistman noticed damage to the conveyance roof via his TV monitor. Earlier, during the same hoisting trip he had noted a "Blip" on his hoist motor ammeter. Examination by the skiptender revealed damage had occurred to the skip roof, and the shaft conveyance safety bar was found to be bent on the companion cage. A trial run was carried out and the skipping operation was resumed. A shaft inspection the following day found shaft dividers broken at the 600 - 700 level and also some broken guides. The skip roof was bent upwards and five guide wheels and brackets were damaged.

CAUSE: It is assumed that a piece of muck which had fallen from the skip became lodged in the shaft timber. The skip hit the piece of muck as it descended.

PREVENTATIVE ACTION: A policy and procedure for reporting shaft or conveyance occurrences had been prepared and distributed. The hoistman and skiptender on duty did not abide by the procedure. The skiptender stated they had experienced repeated incidents that had seemed similar, and no damage had resulted. All personnel involved have been interviewed, warned and reminded to observe the published procedure.

UO-851113-03-07-HS Nov. 13/85 Renabie Gold Mines Ltd., Renabie Mine

INCIDENT: When a full skip was being hoisted from the loading pocket, the hoist tripped on overload. The overwind and track limit protection operated; but the brakes did not operate fast enough to prevent the skip in the dump from hitting the bulkhead. The 3 top guide roller wheels on the conveyance were damaged.

CAUSE: Too much dead time in the application of the fast brake.

PREVENTATIVE ACTION: 1. Instructions were issued to the hoistman to limit the power when leaving the pocket.
2. Arrangements have been made for a consultant to up-grade the braking system.

UO-851117-03-08-HS Nov. 17/85 Inco Limited, Little Stobie

INCIDENT: While a new balance rope was being installed on a friction hoist, a winder-tensioner failed. This allowed the new rope to unwind and fall down the shaft. The new rope and the three other tail ropes were damaged, as well as the rope dividers in the shaft.

CAUSE: After about 2/3 of the rope had been fed down the shaft, a nipple broke on the Redpath WT-100 winder-tensioner. This caused a loss of hydraulic pressure. The brake on the reel stand was out of adjustment and could not hold the rope.

PREVENTATIVE ACTION: The winder-tensioner was sent back to the owner. All four tail ropes were replaced and rope dividers in the shaft were repaired. In the future - a winder-tensioner will be used which does not allow the rope to run free on failure of the hydraulic system.

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UO-851118-03-09-HS Nov. 18/85 Campbell Red Lake Mines Ltd., Campbell Red Lake Mine
INCIDENT: Muck spill down shaft.
CAUSE: The cagetender rang the signal to dump #1 skip which had been filled with ore. He did not notice a piece of muck jammed the measuring pocket dump door partially open. As he refilled the measuring pocket, approximately 1 ton of muck escaped and fell down the shaft.
PREVENTATIVE ACTION: Caution all skiptenders to inspect and ensure the measuring pocket dump door is effectively closed prior to filling the measuring pocket.

UO-851203-03-10-HS Dec. 3/85 Rio Algom Ltd., Quirke II
INCIDENT: During skip inspection, it was discovered that a skip hoist rope had slipped approximately 10 inches in the thimble, bunching 3 clamps against the thimble.
CAUSE: On December 2, this skip was overloaded and tripped out 11 times. Ten were in the slow speed area; but one was at full speed near 800 level. It is suspected the slippage may have occurred at the time of the high speed trip. This rope has 9 clips at the thimble. Ten clips were torqued to 375 lb/ft; the one nearest the thimble is torqued to 200 lb/ft. This is according to accepted values.
PREVENTATIVE ACTION: 1. Any skip weight problem will be reported to the captain by the hoistman.
2. New terminations were made on both ropes, using 11 clips instead of nine.
3. Torques will be checked in an ongoing program.

UO-851203-03-11-HS Dec. 3/85 Rio Algom Ltd., Quirke II
INCIDENT: An electrician, working on the dynamic braking circuit of the cage hoist, closed the dynamic braking contactor while the hoist was in motion at full speed. The resulting short circuit damaged the dynamic braking D.C. supply silicone controlled rectifiers and resulted in a regulated stop in the shaft. There were no injuries.
CAUSE: Poor communications between maintenance and operation people.
PREVENTATIVE ACTION: 1. All personnel working on hoisting equipment will be re-instructed in proper procedures.
2. Warning notices will be installed on the equipment.

UO-851208-03-12-HS Dec. 8/85 Renabie Gold Mines Ltd., Renabie Mine
INCIDENT: The No. 2 skip door was damaged. When the hoistman had dumped the skip, a piece of muck lodged on the right hand arm and when the skip backed out of the dump, the piece of muck caused the skip door to spread when the door closed. There were no injuries and the skip was damaged.

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CAUSE: Apparently big muck.
PREVENTATIVE ACTION: The skip tenders have been instructed when hoisting big muck, to notify surface to have someone watch the skip dumping to prevent a reoccurrence.

UO-851210-03-13-HS Dec. 10/85 Falconbridge Ltd., Fraser Mine
INCIDENT: While the cage was being lowered, a set of track-switch points fell out of the cage.
CAUSE: The switch point was placed on edge beside a truck of track ties in the cage. It is suspected that vibration caused the switch point to move. The kick plate was not in place.
PREVENTATIVE ACTION: Install a kick place and load conveyances properly.

UO-851211-03-14-HS Dec. 11/85 Falconbridge Ltd., Fecunis - North Mine
INCIDENT: During the skip inspection, a mechanic noted that a small part of one dump arm and roller were missing from the skip.
CAUSE: It is suspected that a chunk of muck became wedged between the arm and the skip, and that during the dump cycle the arm broke off.
PREVENTATIVE ACTION: A new arm and roller were installed. Skip inspection will be continued.

UO-860102-03-15-HS Jan. 2/86 Rio Algom Ltd., Quirke II
INCIDENT: #1 skip was being lowered to the loading pocket when the bottom shoe of the skip caught on the liner plate of the guide and ripped the guide out of its position. One steel plated guide was destroyed.
CAUSE: The guides at the loading pocket have steel plates installed over the wood. The bottom shoe of #1 skip had lost the bevel and the square end of the shoe got caught on the steel plate on the guide and ripped it out of position.
PREVENTATIVE ACTION: The steel plated guides have been replaced without the steel liner plates. Looking into replacing present guides with steel guides.

UO-860106-03-16-HS Jan. 6/86 Dickenson Mines Ltd., Arthur W. White Mine
INCIDENT: Spill of waste fines down shaft.
CAUSE: The waste pass temporarily hung up. When it became unblocked, a run of fine muck overfilled the measuring pocket and chute slide.

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PREVENTATIVE ACTION: This waste pass will not be used until the control chains are repaired, and the measuring/loading mechanism is in dependable condition. Shaft hoisting procedures have been reviewed with all hoistmen, skiptenders and supervisors. These procedures will be stringently enforced.

UO-860116-03-17-HS Jan. 16/76 Pamour Mines, Ross Mine
INCIDENT: During skip inspection, it was discovered that after considerable problems and kickouts due to an overloaded skip, the hoist rope had slipped 18 inches in the thimble. This had happened previously on December 3, 1985; and at that time extra clips were added. One of the trips was a high-speed trip, as in the previous case. There were 11 clips on the rope rather than the nine recommended; and torques were to Ministry of Labour standards. These ropes are ultra-high tensile, flattened strand type.
CAUSE: Overloading of the skip, probably aggravated by the full speed trip.
PREVENTATIVE ACTION: 1. Clips were torqued to Crosbie recommendations. (About twice the M.O.L. standard value).
2. Management are investigating possible purchase of different attachments.
3. The ongoing torque checking program will continue while further investigation of the incident is carried out.

UO-860116-03-18-HS Jan. 16/86 Pamour Mines, Ross Mine
INCIDENT: A skip was hoisted through the dump position at greater than normal speed. The overwind, underwind and track limit switches operated, but by the time the brakes set the attachment cable clamps had been wound into the sheave wheel, breaking the flange and damaging the skip.
CAUSE: The Lilly controller on the skip side was out of adjustment. The top retardation cam was approximately 1 inch too high on the dial and the overspeed contact gap was approximately 1/4 inch with the roller on top of the cam. There was also operator error, he thought he was still one turn of the drum below the dump. The retardation cam on the other Lilly controller was not brought into play because skipping at this time was from a mid shaft loading pocket.
PREVENTATIVE ACTION: All company Lilly controllers will be inspected monthly by a person qualified in the maintenance and overhaul of Lilly controllers. The inspections will be documented in the Hoisting Machinery Record book. This is in addition to the regular weekly inspections.

UO-860116-03-19-HS Jan. 16/86 Falconbridge Ltd., Onaping
INCIDENT: A small chunk of waste rock hit the cage as it was ascending. The hoistman saw a flicker in the ammeter needle and immediately stopped the cage. Visual checks on the cage showed no damage after the incident. A shaft inspection found a piece of waste rock resting on shaft timber in the area of the incident.

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CAUSE: The shaft inspection found no loose on the shaft walls and there was no damage to the shaft timber. The piece of waste rock was the only thing that could have hit the cage.
PREVENTATIVE ACTION: No preventative action available since no cause could be found for the piece of rock being where it was. Shaft conditions were inspected and found to be normal.

UO-860123-03-20-HS Jan. 23/86 Inco Limited, C.C. South Mine
INCIDENT: A shaft door at the loading pocket opened while the skip was not at the proper loading position. About 2/3 of a skip load fell down the shaft to the spill deflectors. The only damage was to two bell cords in the shaft.
CAUSE: Investigation found that the power rectifier was passing 7 volts AC through to the DC power bus in the logic module. The AC power was enough to scramble the logic operation in the module and cause the gate to open.
PREVENTATIVE ACTION: No preventative action given as this was the first time such a malfunction occurred.

UO-860129-03-21-HS Jan. 29, 1986 Rio Algom Ltd., Panel Mine
INCIDENT: Bent bar on cage door. No injuries or damage.
CAUSE: Possibly hit by forklift when loading cage. Shaft was inspected and nothing unusual found.
PREVENTATIVE ACTION: The company will review the incident in detail with workers to insure proper procedures are followed.

UO-860131-03-22-HS Jan. 31/86 Inco Limited, Creighton Mine
INCIDENT: At #9 shaft, a skip left the loading pocket before the pocket had finished loading the skip. About 3 tons of muck fell down the shaft causing minor damage to electric cables and shaft signal pull cords in the skip compartment.
CAUSE: While the loading pocket was being operated manually, an ASEA pressductor gave a false "bin empty" reading to the skip hoist controls, causing the skip to leave before the measuring box was empty and the shaft door closed.
PREVENTATIVE ACTION: A circuit will be installed in the loading pocket manual controls to prevent the skip leaving until the measuring box shaft door is closed. This circuit already exists in the loading pocket automatic controls.

UO-860210-03-23-HS Feb. 10/86 Falconbridge Ltd., Fraser Mine
INCIDENT: As the cage was being chaired at the 34 level station, a link on one of the chain chairs broke, causing the bottom chairing loop to fall down the shaft.
CAUSE: As the cage was being chaired, one of the chairs was missed by the cage, putting all the weight on the other chair. A link, weakened by wear, broke as the chair took the weight.

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PREVENTATIVE ACTION: All chairing chains were checked and worn ones were replaced. The company had the importance of chairing the cage on both chairs reviewed with the workers.

ROCK MOVEMENT - RM

UO-850705-03-01-RM July 5/85 Domtar Ltd., Goderich Mine
INCIDENT: Between July 5th and July 8th, 1985, a fall of ground occurred in the intersection of drifts 23A and 109. The area of fall was approximately 75 feet x 60 feet x 4 feet thick. The area is located at the former room and pillar terminus of the mine, but now forms the intersection of a four room system and a three room system/pillar split.
CAUSE: Investigation of the incident suggests the following as the cause of this ground fall: 1. Abnormal stress distribution because of the location of the intersection which is next to the virgin abutment pillar.
2. Deteriorated bedding planes due to the presence of migrating brine.
3. Improper support method. The intersection had been bolted with 4 foot expansion type bolts.
PREVENTATIVE ACTION: 1. Room and pillar mining has already been discontinued.
2. Intersection has already been rehabilitated with 14 foot bolts.
3. An extensometer had been installed in this intersection.
4. Extensometers have been installed in other intersections to monitor the ground movement in order to take corrective action before ground falls.
5. An early warning device (guardian angel) has been installed in all intersections of the new mining system, to incorporate with (4) above.

UO-850830-03-02-RM Aug. 30/85 Inco Limited, Creighton Mine
INCIDENT: Rockburst 859 occurred in 4420 destress slot on 6600 level and displaced about 13 tons of muck.
CAUSE: The burst followed a VRM blast by 19 minutes.
PREVENTATIVE ACTION: 4420 destress slot was driven next to the stoping block to create a weakness to attract stress.

UO-850918-03-03-RM Sept. 18/85 Inco Limited, Creighton
INCIDENT: A rockburst displaced about 17.5 tons of rock from 4 different draw point locations on 5800 level.
CAUSE: Unknown.
PREVENTATIVE ACTION: Some re-habilitation to be done and the area monitored with microseismic equipment.

UO-850920-03-04-RM Sept. 20/85 Falconbridge Ltd., Fecunis-North
INCIDENT: A fifty pound chunk of loose came off the shaft wall just above the 2300 level. As it fell down the shaft, it caused the tail ropes of the cage friction hoist to bunch together and tangle. It also knocked some lining planks into an adjacent skipping compartment.
CAUSE: No specific reason for the loose to fall.
PREVENTATIVE ACTION: Shaft inspected for any more loose and all damage repaired before resuming hoisting. The shaft is inspected on a regular basis.

UO-850925-03-05-RM Sept. 25/85 Denison Mines Ltd., Denison No. 2 Shaft
INCIDENT: A rockburst occurred in the west wall of 24083 long hole slot. There were no injuries or damage and no interruption of operations. The occurrence took place in an area of the mine that was closed down in June 1984. Approximately 5 tons was displaced.
CAUSE: Gradual deterioration of the pillars in this area of the mine has resulted high stresses. The pillar was heavily jointed and fractured.
PREVENTATIVE ACTION: All mining activity in the area had been discontinued. The area has been monitored since April 1984 using rock mechanics instrumentation.

UO-850930-03-06-RM Sept. 30/85 Inco Limited, Creighton Mine
INCIDENT: Two rockbursts in the same location displaced approximately 35 tons from the back and wall of a development ramp between 7000 and 7200 level.
CAUSE: The ground is massive granites and grano diorites jointed into large blocks. One burst followed a blast by one hour. The 2nd burst occurred 2 1/2 days later.
PREVENTATIVE ACTION: The ramp is to be bolted with 8' mechanical and rebar bolts. Screening is to be carried to within 5' of the face and 7' from the floor. Two 24' destress holes are to be drilled in the face and 8-12' holes are to be drilled at a 45° angle. Preshear holes on 30" centres are drilled around the perimeter.

UO-851016-03-07-RM Oct. 16/85 Dickenson Mines Ltd., Arthur W. White Mine
INCIDENT: The night shift came in their stope and noted a large area of the back had come down between shifts.
CAUSE: Too large an area had been left without rockbolting. The ground broke along a fault shear zone.
PREVENTATIVE ACTION: Re-instructed to enforce proper ground support.

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UO-851021-03-08-RM Oct. 21/85 Inco Limited, Creighton Mine
INCIDENT: A rockburst displaced 16 tons from the shoulder of a mechanized cut-and-fill stope on 6800 level.
CAUSE: Massive sulphides in contact with grey granite. The zone is strongly jointed and undercut by another stope.
PREVENTATIVE ACTION: Re-condition area and drill destress holes.

UO-851101-03-09-RM Nov. 1/85 Rio Algom Ltd., Stanleigh Mine
INCIDENT: As the crew were rehabilitating the area, the ground snapped ahead of them. They moved out and reported the snapping to their supervisor. When they returned another 200 to 300 tons of rock had fallen.
CAUSE: Three faults run across this stope and there is pressure in this area. The falls of ground appear to be related to geological weaknesses.
PREVENTATIVE ACTION: The incline is permanently closed down.

UO-851102-03-10-RM Nov. 2/85 Inco Limited, Creighton Mine
INCIDENT: Burst #862 displaced about 125 tons of rock on 5200 level. Air, water, electric and sandfill service lines were severed.
CAUSE: A VRM crown blast was taken 2 1/2 hours before the burst. The damaged area is in the quartz diorite dike.
PREVENTATIVE ACTION: Microseismic equipment is used to monitor the area.

UO-851102-03-11-RM Nov. 2/85 Inco Limited, Creighton Mine
INCIDENT: Rockburst 863 occurred in 3400 MCF unit on 600 level and displaced 1400 tons; 200 tons displaced by the burst and 1200 tons fell.
CAUSE: A VRM blast was taken about 45 minutes before the 1st burst.
PREVENTATIVE ACTION: The area is monitored by microseismic equipment.

UO-851109-03-12-RM Nov. 9&17/85 Falconbridge Ltd., Strathcona Mine
INCIDENT: Several rockbursts from the back of 23 & 40 up ramp on 2300 level over an 8 day period displaced about 98 tons. Two rockbursts 6 minutes apart occurred Saturday, November 9, and a Richter 2.7 occurred the following Sunday, November 17.
CAUSE: A four foot wide diabase dyke passes through the main sill. This stoping block is in the main sill area.
PREVENTATIVE ACTION: The magnitude of the blasts have been increased and since October 18 have taken place at the end of Friday 4-12 shifts to promote the occurrence of rockbursts and seismic activity during the weekends. Openings, such as stopes and ore passes, that are not required are to be backfilled.

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UO-851118-03-13-RM Nov. 18/85 Inco Limited, Creighton Mine
INCIDENT: A rockburst in a decline below the 7000 level displaced 15 tons of rock from the face of a 14' x 16' down ramp.
CAUSE: The decline is approaching a major geological structure. The heading has encountered a strongly jointed and very blocky zone.
PREVENTATIVE ACTION: Diamond drill to assess the ground ahead. A new destress pattern is being investigated.

UO-851207-03-14-RM Dec. 7/85 Falconbridge Ltd., Lockerby Mine
INCIDENT: A fall of ground of approximately 2300 tons fell from the brow of a transverse blasthole stope after a 2200 ton blast was initiated.
CAUSE: The fall of ground occurred in massive sulphides and was controlled by geological structure. The back had been supported with rockbolts, screen and 20 foot cable bolts on a 7 foot pattern.
PREVENTATIVE ACTION: Ground movement monitors will be installed. All mucking in the area will be done under remote control.

UO-851212-03-15-RM Dec. 12/85 Renabie Gold Mines Ltd., Renabie
INCIDENT: A worker was mucking with a two yard electric scooptram when the brow of the drawpoint came down causing a run of muck that partially buried the scooptram. The employee received lacerations and bruises when he jumped off the machine while the muck was falling around him.
CAUSE: A collar measuring two feet thick by four feet long was left intact when the drill rings were blasted. This collar came down when the operator started mucking, resulting in a run of muck.
PREVENTATIVE ACTION: More attention by worker to checking after a blast for brow hang-up and blast large muck down.

UO-851216-03-16-RM Dec. 16/85 Inco Limited, Garson
INCIDENT: A fall of ground of approximately 350 tons fell from the back of a Vertical Retreat Mining stope.
CAUSE: The fall, which occurred in the brow area, was a result of slabby high grade ore, cross jointing and a Vertical Retreat Mining blast.
PREVENTATIVE ACTION: Ground support will continue to be used in these areas.

UO-851219-03-17-RM Dec. 19/85 Inco Limited, Creighton
INCIDENT: A rockburst displaced about 7 tons from the north wall of an ore pass drift located 1760 metres below surface.

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CAUSE: The cause was not known though the orepass had enlarged due to sloughing and wear probably causing a stress redistribution. There was no active mining near this location. The rock was a granodorite.
PREVENTATIVE ACTION: This location is outside the microseismic array but there has been periodic low level seismic activity recorded from this area.

UO-851220-03-18-RM Dec. 20/85 Inco Limited, Creighton
INCIDENT: Approximately 225 tons was dislodged from the back and walls of four panels in a 5 panel stope 2673 metres below surface.
CAUSE: The rockburst which occurred inside the orebody was induced by mining. The cause was a combination of a re-alignment of stress due to the excavation of the mine openings. The rock, a norite is occassionally associated with rockbursts.
PREVENTATIVE ACTION: Rebolt to the burst area and install safety barricade. The microseismic system which had been installed in the mine was not operating due to a printer malfunction.

UO-851221-03-19-RM Dec. 21/85 Falconbridge Ltd., Strathcona
INCIDENT: About 750 tons of material was dislodged from two locations in access drifts to some Vertical Retreat Mining panels during a Richter 3.2 rockburst. A further 200-300 tons sloughed from a rock-dyke contact.
CAUSE: Previous seismic activity in this area, due to stress and geological structures had forced the closure of the stope in November 1985.
PREVENTATIVE ACTION: New barricades are to be erected and the area is being filled. Further blasting in adjacent stopes will be halted until the last shift before the Christmas shutdown. Additional blasting will depend on the amount of seismic activity during the shutdown.

UO-851224-03-20-RM Dec. 24/85 to Jan. 2/86 Inco Limited, McCreedy West
INCIDENT: A fall of ground of approximately 1200 tons occurred in a topsill pillar on 980 level, 5620 pillar.
CAUSE: 1. A crown blast, at least 3 days prior may have damaged rock integrity.
2. Slickensided jointing of ground in the immediate area.
3. A topsill drift had broken into a stope void.
PREVENTATIVE ACTION: Areas are to be completely filled (it should be noted that it was assumed area was totally filled).

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UO-860114-03-21-RM Jan. 14/86 Lac Minerals, Macassa Mine
INCIDENT: On January 13, 1986, at 1:30 A.M., a rockburst occurred in the 5804 stope of Macassa Mine. Approximately twenty tons of rock was displaced off the back and north wall of this stope. There were no personal injuries. Material damage consisted of three broken wood headboards.
CAUSE: 58-40 stope is mined cut-and-fill method. Eight foot uppers are drilled and blasted on each successive cut. The back and walls are supported with 5/8" x 8' and 5' mechanical rockbolts which are installed on a random pattern. The stope is mined on a single shift basis. The 58-40 stope is situated on the 04 break, the major structural feature associated in the underground workings on Macassa Mine. On the day of the burst, the crew reported that the back was active and some ground "snapping" was encountered. On the nightshift of January 13, 1986, stope crews working in close proximity to 58-40 stope reported hearing a minor burst at 1:30 A.M. On the dayshift of Janaury 14, 1986, the crew in 58-40 stope discovered the damaged back and wall. Indications are that this burst was caused by an increase in mining induced stress as the ore block decreases in height.
PREVENTATIVE ACTION: The rock mechanics department is presently in the process of planning a destress program in this stope.

UO-860117-03-22-RM Jan. 17/86 Inco Limited, Garson
INCIDENT: A rockburst displaced about 300 tons of material from the back of the 2431 sill on the 3440 level over 2 mined out Vertical Retreat Mining (VRM) panels. The event occurred within the orebody consisting of ore stringers in greenstone, norite and highly sheared and schistose metasediments. The ground support comprised of mechanical bolts and screen.
CAUSE: The rockburst was caused by a high stress build-up in the sill pillar, induced by mining, and was probably triggered by VRM blasting in an adjacent panel.
PREVENTATIVE ACTION: Access to the area has been restricted and further stress build-up will be minimized by backfilling the mined out panels.

UO-860120-03-23-RM Jan. 20/86 Inco Limited, C.C. North Mine
INCIDENT: A rockburst in 3 different locations displaced an unknown, but estimated to be more than 50 tons, of material, from pillars on 3835 level.
CAUSE: An unusual stress distribution probably led to the burst.
PREVENTATIVE ACTION: At the present time there is no preventative action that can be taken. The 113 stope is in the extreme south end of the ore body and the area will be monitored.

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UO-860125-03-24-RM Jan. 25/86 to Jan. 28/86 Inco Limited, Garson
INCIDENT: A fall of ground of approximately 650 tons occurred from the back of 3741 VRM stope, 3600 level.
CAUSE: There is no apparent structural or geological weakness in the vicinity. The fall is probably due to blasting in 3801 panel.
PREVENTATIVE ACTION: The travelways to this stope were previously barricaded. The area is to be re-conditioned before mining continues.

UO-860127-03-25-RM Jan. 27/86 Inco Limited, Garson
INCIDENT: Approximately 400 tons fell from a drift floor on 3600 level, 4250 stope, into the stope below. The opening was approximately 6' x 8'.
CAUSE: The uneven back of the stope created a void that was not filled. Secondary blasting over the void created a weakness that subsequently fell.
PREVENTATIVE ACTION: Microseismic monitoring is planned for this mine. The void will be backfilled before mining commences.

UO-860213-03-26-RM Feb. 13-16/86 Inco Limited, C.C. North Mine
INCIDENT: After a 5000 lb. VRM blast in a 40' x 20' x 100' stope the adjacent areas suffered a series of rockbursts over 3 days.
CAUSE: The stope is at the extreme south end of the orebody where it narrows from a width of 40-50' to 15-20'. The rockbursts occurred in pillars within the orebody where stresses have been induced by mining. The bursts were likely triggered by blasting in adjacent areas.
PREVENTATIVE ACTION: Blasts on January 20, 1986 and February 13, 1986 have resulted in bursts. The blast planned for February 21, 1986 will be larger than usual in order to take the remaining 20,000 $\pm$ tons all at once. The mine will not have anyone underground for the weekend following the blast.

UO-860219-03-27-RM Feb. 19/86 Inco Limited, Creighton Mine
INCIDENT: A rockburst occurred in 5208 drift on 6000 level. The burst displaced 18 tons along the drift walls and heaved the track for about 50 feet and had a magnitude (ML) of 2.4.
CAUSE: There was previous mining 30' below level (abandoned and filled). Likewise there was previous mining of a cut-and-fill stope above 6000 level (abandoned and filled). The burst was likely the result of mining induced stress in the granodiorite rocks surrounding the drift development.
PREVENTATIVE ACTION: There is no preventative action. This area will be rebolted and screened and the drift repaired.

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UO-860219-03-28-RM Feb. 19/86 Falconbridge Ltd., Lockerby
INCIDENT: A fall of ground of approximately 2500 tons fell from the back of a stope shortly after a blast in a drop raise. The fall was structurally controlled and the back has arched to about 20' at the peak. The ground peeled around the cables since no broken cables were observed.
CAUSE: Probable causes: The 20-134 stope is a tertiary pillar. The undercut is 54' wide. Blast concussion. Poor bonding of cables with grout. The undercut was showing signs of deterioration.
PREVENTATIVE ACTION: GMM's (Ground Movement Monitors) were scheduled for this undercut but none had been installed. In the future (a) Swellex bolts will be installed with face advance. (b) One GMM per 100 feet of advance will be installed. (c) Two rows of 9" flats will be installed when an O/C (overcut) turns into an U/C (undercut). Load cells will be installed on selected O/C in operation now. (d) all access to U/C's will be restricted.

UO-860221-03-29-RM Feb. 21-22/86 Inco Limited, C.C. North Mine
INCIDENT: A burst of 3.5 Richter followed a production blast of 20,000 lbs. in a 40' x 20' x 100' VRM stope. Four subsequent bursts measured 2.2 to 2.7 R. between 3600 - 3935 levels and apparently within pillars in the orebody.
CAUSE: The stope is in the extreme south end of the orebody. The host rock is a dry, brittle, high strength granite. The contact is heavily brecciated. The bursts can be associated with mining induced stress in pillars and triggered by blasting in adjacent areas.
PREVENTATIVE ACTION: Mining in this area will probably not resume for 4-5 years, until the block between 3400 and 3600 is to be removed.

UO-860225-03-30-RM Feb. 25/86 Inco Limited, Stobie
INCIDENT: A fall of ground approximately 800 to 900 tons fell from the back of 39.90 x-cut, 1850 level. The fall of ground was approximately 8' high over a 50' length.
CAUSE: Probable causes: The fall of ground was influenced by flat blocky structure in the massive sulphide and peeled back to the H.W. contact. The block was above the ground support in this area which consisted of mechanical anchored bolts and screen.
PREVENTATIVE ACTION: The 3990 x-cut has been barricaded off and a reconditioning programme will be scheduled in the near future.

UO-860226-03-31-RM Feb. 26/86 Inco Limited, Garson
INCIDENT: A fall of ground of approximately 20 tons fell from the brow of the 1923 stope hanging wall drift on the 3600 level. The J.S. 220 which was mucking remote control was buried and received minor damage.

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CAUSE: The brow failure was caused by ground deterioration induced by VRM blasting in 1840 panel. The ground conditions consisted of slabby, blocky jointed disseminated norite. Six foot mechanical bolts were holding up material on the H.W. side of the brow.
PREVENTATIVE ACTION: The H.W. drift was reconditioned with 8' swellex on a 4' x 4' pattern prior to any VRM blasting in this area.

VEHICLES - MV

UO-850927-03-01-MV Sept. 27/85 Canadian Salt Co., Ojibway Mine
INCIDENT: Two powdermen were on the platform of an ANFO rig (fork lift truck) that was being raised to load the top holes. One of two lift chains disconnected and the other jammed. The platform fell to the floor. Two workers were injured.
CAUSE: The retaining nut fell off the disconnected lift chain. The other chain jammed due to worn parts and lack of lubrication.
PREVENTATIVE ACTION: The company has revised and upgraded their preventative maintenance program. This includes the following items:
1. Check retaining nuts.
2. Adjust chains for equal loads.
3. Check link segements for wear.
4. Lubricate per manufacturer's recommendations.
5. Check mast rollers for wear.

UO-851120-03-02-MV Nov. 20/85 Denison Mines Ltd., Denison
INCIDENT: The operator of #12216 scissor lift truck had stopped the machine and applied the emergency brake. Before he could position the wheel chock, the truck rolled 60 ft., stopping when it struck a pillar wall. There were no injuries. Damage to the machine was a broken steering hose, broken guardrail and displaced platform.
CAUSE: The operator did not perform proper pre-operating tests. Poor maintenance and repair on vehicle.
PREVENTATIVE ACTION: The operator's licence has been suspended and he has been disciplined in the form of a written warning. The maintenance department will be more accountable for quality control on maintenance of equipment.

UO-851126-03-03-MV Nov. 26/85 Denison Mines Ltd., Denison
INCIDENT: While a Jarvis Clark JDT-426 LP low profile haulage truck was waiting to be loaded, the operator noticed flames coming from behind the dash. He used the fire suppression system to put out the fire.

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CAUSE: Faulty wiring in dash.
PREVENTATIVE ACTION: Re-wire all low profile haulage trucks using wiring harnesses, terminal strips.

UO-851202-03-04-MV Dec. 2/85 Rio Algom Ltd., Quirke II
INCIDENT: At 12:10 A.M., the operator a 3 1/2 cu. yd. scooptram noticed sparks near the air tank. He stopped to investigate and a fire broke out. The operator activated the fire suppression system and extinguished the fire. There were no injuries. Damage was limited to one compressor hose.
CAUSE: The hose from the compressor to the air tank broke off and some oil from the hose leaked onto the hot manifold and ignited.
PREVENTATIVE ACTION: Hoses will be checked as part of the pre-operating inspection.

UO-851204-03-05-MV Dec. 4/85 Inco Limited, Little Stobie
INCIDENT: A hydraulic oil leak on a JCI-600 scooptram sprayed oil over the hot exhaust scrubber, causing it to ignite. The resulting fire in the engine compartment was put out by the operator, who activated the fire suppression system.
CAUSE: The oil leak was from a crack in the steering pump housing.
PREVENTATIVE ACTION: The checking of the steering cylinder and valves has now been made a part of the 200 hour maintenance check.

UO-851205-03-06-MV Dec. 5/85 Rio Algom Ltd., Quirke II
INCIDENT: The operator of a Ford 4-wheel drive tractor was backing down an incline switch back and in trying to turn around came too close to the edge of the road. The road gave way and the tractor tipped on its side. There were no injuries. The tractor received a flat tire and damaged battery.
CAUSE: The tractor came too close to the edge of the road. The road had no berm or guard.
PREVENTATIVE ACTION: The water and air lines were raised and guard rails installed.

UO-851211-03-07-MV(F) Dec. 11/85 Rio Algom Ltd., Stanleigh Mine
INCIDENT: The operator of a 6 cu. yd. scooptram noticed flames from the area of the battery box. He stopped the scooptram and activated the fire suppression system, but the fire continued to burn. The operator reported the incident to his shift boss, who assisted by two men and the operator, disconnected the battery and used two hand extinguishers to put out the fire. There were no injuries. A hydraulic hose and battery cable were damaged.

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CAUSE: A wire reinforced hydraulic hose had been installed over the battery box and had rubbed against the positive lead on the battery.
PREVENTATIVE ACTION: All other scooptrams have been checked for hose installation; none were found improperly installed.

UO-851220-03-08-MV Dec. 20/85 Lac Minerals Ltd., Lakeshore Mine
INCIDENT: The operator left the loaded and unattended Dux truck on an underground ramp to pick up a piece of metal. The truck rolled back down the ramp, 125 feet, and stopped in a remuck bay.
CAUSE: It appears to have been operator error as all subsequent brake tests were positive.
PREVENTATIVE ACTION: Workers have been re-instructed on procedures, (i.e. turn weels toward wall, use wheel chocks and engage brakes when parking vehicles on a ramp).

UO-860102-03-09-MV(F) Jan. 2/86 Noranda Inc., Mattabi Mines Ltd.
INCIDENT: An asbestos blanket wrapped around the truck's exhaust close to the engine compartment ignited. Oil had accumulated in the asbestos blanket.
CAUSE: Oil accumulation close to the exhaust heat.
PREVENTATIVE ACTION: Asbestos blanket has been replaced with an asbestos gasket.

UO-860106-03-10-MV(F) Jan. 6/86 Algoma Steel Corp., Ore Div., MacLeod Mine
INCIDENT: A worker was attempting to drive a "Getman" service vehicle when he noticed smoke coming from the emergency brake. Hestopped the machine and used a fire extinguisher. There were no injuries. Damage was restricted to the emergency brake pads.
CAUSE: The unqualified worker did not release the emergency brake before moving the vehicle.
PREVENTATIVE ACTION: Workers have been instructed not to operate any equipment unless they are duly licensed.

UO-860115-03-11-MV(F) Jan. 15/86 Denison Mines Ltd., Denison
INCIDENT: After finishing his pre-shift check of a Jarvis Clark haulage truck, the operator started the vehicle. A fire broke out in the battery compartment. The operator used a 10 lb. fire extinguisher to put out the fire.
CAUSE: A broken battery bracket had allowed the battery to move and arc to the vehicle frame. A leaking hydraulic hose provided the fuel for the arc to ignite.

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PREVENTATIVE ACTION: Re-route hydraulic hoses if possible, to get them out of the battery compartment. Investigate the feasibility of installing a more substantial battery bracket.

UO-860117-03-12-MV(F) Jan. 17/86 Denison Mines Ltd., Denison
INCIDENT: While operating an ST-3 1/2 scooptram, the operator noticed smoke coming from the engine compartment. The operator used the vehicle's fire suppression system to put out the fire.
CAUSE: The exhaust had come apart at the PTX scrubber. The hot exhaust, from an overheated engine ignited the oil soaked garbage in the area. Clogged coolers caused the engine to overheat.
PREVENTATIVE ACTION: Denison is establishing wash stations in the various areas of the mine. Each wash station will have water under pressure to remove the day's accumulation of grime. Operators are being instructed to wash vehicles on a daily basis.

UO-860122-03-13-MV(F) Jan. 22/86 Denison Mines Ltd., Denison
INCIDENT: The front disc brake of a Jarvis Clark scissor lift caught on fire while the vehicle was being operated. The operator used a hand fire extinguisher to put out the fire.
CAUSE: A dragging service brake caliper on the front brake heated up the disc and some oil that was lying on the front skid plate. The oil is what caught on fire.
PREVENTATIVE ACTION: Preventative maintenance crews have been reminded about checking for disc brake caliper operation.

UO-860124-03-14-MV Jan. 24/86 Rio Algom Ltd., Quirke II
INCIDENT: A JS-800 scooptram ran away and stopped when it hit a parked scissor lift. There were no injuries. The scissor lift was damaged.
CAUSE: Mechanic was working on unit, when he started the unit using compressed air. The park brake had not been set, and when air pressure built up the brakes released and the unit moved approximately 30 ft. and stopped when it hit the parked scissor lift truck.
PREVENTATIVE ACTION: Scooptram must be turned towards the wall when parked on incline. The motor is not to be started by by-passing the brake release.

UO-860207-03-15-MV(F) Feb. 7/86 Rio Algom Ltd., Stanleigh
INCIDENT: The operator of #24 scooptram noticed flames in the battery compartment. The operator shut off the engine and master switch. He then tried to extinguish the flame with a

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portable extinguisher; then he activated the fire suppression system and extinguished the fire immediately. The employee was sent to the hospital for smoke inhalation. There was no visible damage to the scooptram.
CAUSE: The battery box came loose and pinched a battery lead, causing a short circuit through ground which caused the fire.
PREVENTATIVE ACTION: The maintenance department will ensure that all battery boxes are installed properly with no possible way of coming loose.

UO-860211-03-16-MV(F) Feb. 11/86 Denison Mines Ltd., Denison
INCIDENT: An operator was mucking the upper sump in a conveyorway when he noticed flames shooting out from the midship of the ST8 Wagner Scooptram. He tried to activate the fire suppression system from the operator's compartment but was not successful. He then used a portable fire extinguisher and also activated the fire suppression system in the engine compartment and extinguished the fire. There were no injuries. There were burnt wires, filters and hydraulic hoses.
CAUSE: An electrical wire had its insulation worn through to the conductor and a hydraulic hose incurred a pinhole leak. The atomized oil plus the sparks from the wire touching ground caused the fire.
PREVENTATIVE ACTION: The unit is being rewired and a 70 amp. breaker will be installed to protect against short circuits.

UO-860214-03-17-MV Feb. 14/86 Mattabi Mines, Noranda Inc., Lyon Lake
INCIDENT: A worker was dumping waste rock with a 2 cu. yard scooptram. Returning to get more muck, the scoop rode up a 1 1/2 ft. slab of rock, and the scoop flipped over on its side.
CAUSE: 1. Boulders built up along a narrow roadway.
2. Driver inattention.
PREVENTATIVE ACTION: 1. The roadway (travelway) has been cleaned up.
2. The company had the workers instructed on proper procedures.

UO-860221-03-18-MV(F) Feb. 21/86 Inco Limited, McCreedy West
INCIDENT: A small fire occurred on an ST8 Scooptram. The operator extinguished it with a hand extinguisher. There were no injuries and only minimal damage.
CAUSE: A piece of muck lodged itself in the disc brake area, preventing the brakes from fully releasing. The vehicle was driven for approximately 1250', causing the brake lining to heat up and ignite.
PREVENTATIVE ACTION: A guard will be installed to prevent small chunks of muck from entering the disk brake area.

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WATER (INRUSH OR FLOOD) - IW

UO-851002-03-01-IW Oct. 2/85 Algoma Ore Division, McLeod Mine
INCIDENT: No. 5 shaft was flooded above the loading pocket, shorting out some of the electrical controls for the hoist and the power supply for the pumps.
CAUSE: This area received approximately 10" of rain from September 16 to October 8, 1985. The heavy rainfall combined with the loss of the main pumps, due to a corroded pipe fitting, was the cause of the flooding of the shaft.
PREVENTATIVE ACTION: A comprehensive pipe thickness test program will be completed. All maintenance of the main pumps will be reviewed and updated as required.

UO-851222-03-02-IW Dec. 22/85 Inco Limited, C.C. South Mine
INCIDENT: A run of wet muck from a water drainage finger, off the main orepass, pushed an ST-8 into a wall, flooded the cab and trapped the operator by one leg. The operator was in the act of emptying the spillage from the dewatering finger on 2250 level prior to the Xmas shutdown.
CAUSE: The motor crew claimed that the drains were flowing normally at the start of the shift. A half-hour later the 3 drain holes on 2050 were all plugged and water was going into the orepass.
PREVENTATIVE ACTION: The water finger was constructed to collect water from the orepass to protect the crusher station. In future:
1. More emphasis on cleaning drain screens;
2. Have a procedure drawn up to deal with the designed condition.The crusher operator on 2300 had warned the crew and the General Foreman was also aware of the water in the orepass.

MISCELLANEOUS - MS

UO-851118-03-01-MS Nov. 18/85 Rio Algom Ltd., Panel Mine
INCIDENT: In the concentrator, an operator was transporting a bin of material with a forklift truck backwards down the ramp. The service brake did not hold nor did the emergency brake. The forklift came to an abrupt stop when it contacted a concrete berm. The operator suffered soreness to the back of both lower legs. The forklift was damaged and the concrete berm was cracked.
CAUSE: The right front brake was out of adjustment and one brake shoe was glazed. The emergency brake was out of adjustment. It appears that the operator had not performed a proper brake test.

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PREVENTATIVE ACTION: The operator has been instructed to report any brake problems to the mechanics for immediate correction. All operators have been informed of this incident and instructed on proper operating procedures.

UO-851207-03-02-MS Dec. 7/85 Renable Gold Mines Ltd., Renable
INCIDENT: Ice, which had built up in main ventilation raise, came off the walls and sealed off the raise bottom at the 1250 level, cutting off ventilation to the mine.
CAUSE: The heating plant was started up late this year and several subsequent power failures allowed the ice to build up.
PREVENTATIVE ACTION: Start of heating plant before ice starts to build up and ensure the raise is monitored for water and ice.

UO-851218-03-03-MS Dec. 18/85 Inco Limited, Frood Mine
INCIDENT: A stope crew smelled a strong odour of sulphur dioxide in the workplace and reported the problem immediately.
CAUSE: Tram crews had pulled the chutes of the shrinkage stope the previous week and probably exposed sulphide ore to renewed oxidation.
PREVENTATIVE ACTION: The area will be wetted down or filled with tailings to permanently seal it off.

UO-851220-03-04-MS Dec. 20/85 Inco Limited, Levack Mine
INCIDENT: Two workers entered a bottom sill and encountered foul smelling air and became weak and dizzy. They left the area immediately. Moments later the scoop operator turned on the air fan which forced the foul air to move where the two had retreated. Both workers came to surface and blood level CO tests revealed only a trace.
CAUSE: Possibly, the foul air came from a small void between the crown and the sandfill.
PREVENTATIVE ACTION: Keep area well ventilated.

UO-851227-03-05-MS(F) Dec. 27/85 Rio Algom Ltd., Quirke II
INCIDENT: Fire in waste bin caused by burning and cutting while working on the skip dump. No workers were injured and no major equipment damage.
CAUSE: Hot metal and sparks fell on old rags and cardboard box in waste bin.
PREVENTATIVE ACTION: All combustible material in work area where hot work is performed is to be removed.

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UO-851229-03-06-MS Dec. 29/85 Kidd Creek Mines Ltd., Copper Smelter
INCIDENT: An explosion occurred when cooling water contacted molten copper. The explosion ruptured the syphon shell to an extent that allowed molten copper to leak onto the ground floor.
CAUSE: While the cause cannot be determined absolutely, it is believed that copper leaked from the syphon box at a level below the overflow launder because of a local refractory failure. The copper eventually contacted a water-cooled copper block in the syphon.
PREVENTATIVE ACTION: The damaged components of the syphon were replaced. In addition, two thermocouples were installed within the refractory lining to monitor temperatures and to identify refractory wear. A redesign of the copper blocks in the syphon will be undertaken.

UO-860122-03-07-MS Jan. 22/86 Dickenson Mines Ltd., Aurthur W. White Mine
INCIDENT: Water was being applied to clear a hang-up in #5 waste loading pocket. The deckman requested that the shift boss lift the control chains of the waste pass. The shift boss mistakenly opened the measuring pocket. Approximately two shovels of muck escaped down the shaft.
CAUSE: The wrong control lever was applied.
PREVENTATIVE ACTION: The two levers will be clearly designated by signs.

UO-860122-03-08-MS Jan. 22/86 Inco Limited, C.C. Copper Refinery
INCIDENT: The roof of a Copper Anode Furnace suffered damage in a steam explosion during hot charging.
CAUSE: It is suspected that some form of moisture was in the scrap copper bundles.
PREVENTATIVE ACTION: The Job Safety Analysis (JSA) has been revised to: (a) ensure a better inspection of charge material, (b) better guarding of the furnace area in case of an explosion. Tankhouse supervision are also reviewing their JSA to explain to employees handling anode scraps the hazards of placing tramp material in or in bundles of anode scrap.

UO-860131-03-09-MS(F) Jan. 31/86 Mattabi Mines, Noranda Inc. Lyon Lake
INCIDENT: Employee of TRIMAC was unloading propane at Lyon Lake. When he disconnected the hose propane bled off and was ignited by flame at the vapourizer. Fire was extinguished with hand portable.
CAUSE: Truck operator should have shut off the valves on the line and also the valves at the pump before disconnecting line. Also, the line should have been opened slowly to allow the bleed off to be regulated.

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PREVENTATIVE ACTION: Have propane supply company install longer piping to fence approximately 5 feet.

UO-860131-03-10-MS(F) Jan. 31/86 Kidd Creek Mines Ltd., Zinc Plant Dry Building
INCIDENT: A 3/4 ton pick-up truck was parked at the dry building overnight. The assigned mechanic started the truck and then went into the dry to change into his work clothes. When he returned from the dry, the truck was on fire. In a matter of minutes, the fire spread into the cab compartment. Extinguishers and a fire hose were used to put it out. Total damage was in excess of $5000.00.
CAUSE: The fire apparently originated from the block heater cord due to an electrical short with the engine running.
PREVENTATIVE ACTION: The company will be issuing a safety bulletin to all supervisors regarding the correct procedures to use when a block heater is in use in service vehicles. Block heaters will not be used with the engine running.

UO-860131-03-11-MS Jan. 31/86 Rio Algom Ltd., Quirke Mine
INCIDENT: A service car was being lowered from the sill to main level by means of a tugger hoist when the cable broke. the car freewheeled to the bottom of the decline. There were no injuries and the damage consisted of sheared off axle bolts on the flatcar.
CAUSE: The tugger cable broke because of deterioration.
PREVENTATIVE ACTION: The company will have the cable inspected before each use.

UO-860204-03-12-MS(F) Feb. 4/86 The Canadian Salt Co., Ojibway Mine
INCIDENT: The hot air duct of a silver salt drying system in the surface mill overheated. The wooden flooring next to the duct began to burn. The mill was evacuated and the fire extinguished with hand fire extinguishers. There were no injuries.
CAUSE: Exact cause is not known. The main gas control valve may not have functioned properly and the air flow dampers may have been set wrong.
PREVENTATIVE ACTION: Service contractor has checked all controls. A new gas control valve will be installed. An additional high temperature sensor will be installed in the duct for total gas shut off on overheating. Flooring has been cut back from the duct.

UO-860215-03-13-MS Feb. 15/86 Falconbridge Ltd., Smelter
INCIDENT: A steam explosion occurred in a fluid bed roaster. When the fluidizing air agitated the bed the moisture was turned instantly into steam.
CAUSE: While trying to adjust the feed and the fluidizing air manually, the operator allowed approximately 2.5 tons of feed at 30% moisture to enter the roaster.

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PREVENTATIVE ACTION: 1. The jog feature has been removed.
2. Additional interlocks have been added.
3. All supervisors were instructed to initiate a shut-down rather than bypass with interlock.
4. All supervisors and operators will review company procedures.

UO-860217-03-14-MS Feb. 17/86 Kidd Creek Mines Ltd., Metalurgical Site
INCIDENT: A janitor was sprayed in the right eye with "Hot Shot", a sodium hydroxide based drain cleaner, while attempting to unplug a clogged sink drain.
CAUSE: The chemical blew back when proper procedures as indicated on the container were not followed. The worker was not wearing eye protection.
PREVENTATIVE ACTION: All employees required to use this reagent will be trained in its proper use and handling and they will be required to wear appropriate personal protective equipment.

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